WHAT IS CLAIMED IS:

1. A control system comprising:

one or more controllers configured to determine when to extend a life span of a coating of a turbine engine by applying an additive to the coating based on one or more monitored parameters of the turbine engine, the monitored parameters including one or more of a condition of the coating, an operational parameter of the turbine engine, a comparison between a turbine engine output and a designated output, or an environmental condition;

at least one processor; and

memory operatively coupled to the at least one processor, the memory comprising a restoration history database and a coating restoration parameters database,

wherein the restoration history database comprises a coating restoration type and a date that a previous coating restoration was performed on the turbine engine,

wherein the one or more controllers also are configured to direct application of the additive onto the coating of the turbine engine based on the monitored parameters of the turbine engine,

wherein the processor and memory are in communication with a communication subsystem to receive and transmit information and data for the one or more controllers, and

wherein the one or more controllers are configured to use the historical data to determine an engine coating restoration scheme.

2. The control system of claim 1

wherein the coating restoration parameters database comprises information relating to at least one available coating restoration regimen, and

wherein the coating is a thermal barrier coating.

3. The control system of claim 1 further comprising:

at least one sensor operatively coupled to the one or more controllers,

wherein the monitored parameters include a presence of spalling in the coating as the condition of the coating.

4. The control system of claim 3 wherein the monitored parameters include one or more of a turbine engine fuel flow, a compressor exit pressure, or a compressor exit temperature as the operational parameter of the combustor of the turbine engine, and

wherein the at least one sensor comprises at least one temperature sensor monitoring temperature at the coating.

5. The control system of claim 2 further comprising:

at least one sensor operatively coupled to the one or more controllers,

wherein the at least one sensor transmits real time measurements to the memory and the at least one processor, and

wherein the monitored parameters include one or more of an exhaust temperature, dating of the turbine engine, turbine engine overdriving, turbine engine speed, a number of operational cycles of the turbine engine.

6. The control system of claim 3, the at least one sensor further comprising:

a first sensor, the first sensor positioned to measure an air temperature at a turbine engine inlet; and

a second sensor, the second sensor positioned to measure an air temperature at a turbine engine exhaust,

wherein the monitored parameters include at least one of a presence of dust detected in the operating environment of the turbine engine and an amount of dust detected in the operating environment of the turbine engine.

7. The control system of claim 1 wherein the operational parameter of the turbine engine includes an operational parameter of one or more of a combustor, a turbine shroud, and a combustor fuel nozzle of the turbine engine, and

wherein the turbine engine comprises a multi-shaft turbofan gas turbine engine.

8. The control system of claim 1 wherein the one or more controllers are configured to determine when to extend the life span of the coating by determining a number of operational cycles that the turbine engine performs before the additive is applied to the coating.

9. The control system of claim 1 wherein the one or more controllers are configured to determine when to extend the life span of the coating by determining a trigger point in time at which the additive is to be applied to the coating before continued use of the turbine engine after the trigger point occurs.

10. The control system of claim 1 wherein the one or more controllers are configured to determine when to extend the life span of the coating by determining an engine maintenance date by which the additive is to be applied to the coating.

11. The control system of claim 1 wherein the one or more controllers are configured to determine a residual useful life span of the coating based on the monitored parameters and to communicate the residual useful life span to an operator.

12. The control system of claim 1 wherein the turbine engine is a turbine engine of an aircraft,

wherein the turbine engine comprises:

a turboprop engine; and

a variable pitch propeller.

13. The control system of claim 1 wherein the one or more controllers are configured to determine an amount of additive to apply onto the coating based on the monitored parameters.

14. The control system of claim 1 wherein the one or more controllers are configured to determine a type of additive to apply onto the coating based on the monitored parameters.

15. A method comprising:

monitoring parameters of a turbine engine having a coating, the parameters including one or more of a condition of the coating, an operational parameter of a combustor of the turbine engine, a comparison between a turbine engine output and a designated output, or an environmental condition to which the turbine engine is exposed during operation;

determining when to extend a life span of the coating of the turbine engine by applying an additive to the coating based on one or more of the parameters of the turbine engine that are monitored,

and

directing, by one or more controllers, an application of the additive onto the coating of the turbine engine based on the monitored parameters of the turbine engine, wherein directing, by one or more controllers further comprises providing a coating restoration unit, wherein the coating restoration unit comprises the one or more controllers, the coating restoration unit further comprising:

at least one rail;

at least one glider coupled to the at least one rail;

at least one mechanism attached to the glider; and

at least one spray nozzle attached to the at least one mechanism, the at least one spray nozzle operatively coupled to the one or more controllers,

wherein the at least one rail and the at least one glider provide 360° degree movement of the at least one spray nozzle for applying the additive to any surface of the coating of the turbine engine, and

wherein the directing, by one or more controllers further comprises providing:

at least one processor; and

memory operatively coupled to the at least one processor, the memory comprising a restoration history database and a coating restoration parameters database,

wherein the restoration history database comprises a coating restoration type and a date that a previous coating restoration was performed on the turbine engine,

wherein the processor and memory are in communication with a communication subsystem to receive and transmit information and data for the one or more controllers, and

wherein the one or more controllers are configured to use the historical data to determine an engine coating restoration scheme.

16. The method of claim 15,

wherein the coating is a thermal barrier coating.

17. The method of claim 16 wherein the monitored parameters include a presence of spalling in the coating as the condition of the coating, and

wherein the coating restoration unit increases the amount of the additive applied to the coating of the turbine engine compared to an amount of additive applied to the coating assuming an earlier date of maintenance.

18. The method of claim 16 wherein the monitored parameters include one or more of a turbine engine fuel flow, a compressor exit pressure, or a compressor exit temperature as the operational parameter of the combustor of the turbine engine,

wherein the at least one spray nozzle receives a slurry and air for outputting the additive onto the coating.

19. The method of claim 15 wherein the monitored parameters include one or more of derating of the turbine engine, turbine engine overdriving, turbine engine speed, or auxiliary power use of electric current generated based on movement of the turbine engine as the comparison between the turbine engine output and the designated output, and

wherein determining when to extend a life span of the coating of the turbine engine further comprises determining when to extend a life span of the coating of the turbine engine based at least partially on data of the turbine engine in a test cell.

20. The method of claim 15 wherein the monitored parameters include one or more of a presence or an amount of dust.

21. The method of claim 15 wherein determining when to extend the life span of the coating includes determining one or more of:

a trigger point in time at which the additive is to be applied to the coating before continued use of the turbine engine after the trigger point occurs, and

an engine maintenance date by which the additive is to be applied to the coating.

22. A control system comprising:

one or more controllers configured to monitor one or more parameters of a turbine engine having a thermal barrier coating, the one or more parameters including one or more of a presence of spalling in the coating as the condition of the coating, a turbine engine fuel flow, a compressor exit pressure, a compressor exit temperature, an exhaust temperature, derating of the turbine engine, turbine engine overdriving, turbine engine speed, a number of operational cycles of the turbine engine, auxiliary power use of electric current generated based on movement of the turbine engine, a presence of dust in an environment where the turbine engine operates, or an ambient temperature of the environment where the turbine engine operates,

at least one processor; and

memory operatively coupled to the at least one processor, the memory comprising a restoration history database and a coating restoration parameters database,

wherein the restoration history database comprises a date that a previous coating restoration was performed on the turbine engine,

wherein the coating restoration parameters database comprises information relating to at least one available coating restoration regimen, and

wherein the coating is a thermal barrier coating,

wherein the one or more controllers also are configured to direct application of an additive onto the coating of the turbine engine based on the one or more parameters of the turbine engine that are monitored,

wherein the processor and memory are in communication with a communication subsystem to receive and transmit information and data for the one or more controllers, and

wherein the one or more controllers are configured to use the historical data to determine an engine coating restoration scheme.

23. The control system of claim 22 further comprising a coating restoration system the coating restoration unit further comprising:

at least one rail;

at least one glider coupled to the at least one rail;

at least one mechanism attached to the glider; and

at least one spray nozzle attached to the at least one mechanism, the at least one spray nozzle operatively coupled to the one or more controllers,

wherein the coating restoration system is mounted to a transport vehicle.